

SEQUENCE LISTING

(1) GENERAL INFORMATION:

5 (i) APPLICANT: Jardieu, Paula M.
Presta, Leonard G.

(ii) TITLE OF INVENTION: Humanized Anti-CD11a Antibodies

10 (iii) NUMBER OF SEQUENCES: 71

(iv) CORRESPONDENCE ADDRESS:
(A) ADDRESSEE: Genentech, Inc.
(B) STREET: 1 DNA Way
15 (C) CITY: South San Francisco
(D) STATE: California
(E) COUNTRY: USA
(F) ZIP: 94080

20 (v) COMPUTER READABLE FORM:
(A) MEDIUM TYPE: 3.5 inch, 1.44 Mb floppy disk
(B) COMPUTER: IBM PC compatible
(C) OPERATING SYSTEM: PC-DOS/MS-DOS
(D) SOFTWARE: WinPatin (Genentech)

25 (vi) CURRENT APPLICATION DATA:
(A) APPLICATION NUMBER:
(B) FILING DATE: 19-SEP-03
(C) CLASSIFICATION:

30 (vii) PRIOR APPLICATION DATA:
(A) APPLICATION NUMBER: 60/031971
(B) FILING DATE: 27-NOV-1996

35 (vii) PRIOR APPLICATION DATA:
(A) APPLICATION NUMBER: 08/974899
(B) FILING DATE: 20-NOV-1997

40 (vii) PRIOR APPLICATION DATA:
(A) APPLICATION NUMBER: 09/420745
(B) FILING DATE: 20-OCT-1999

45 (vii) PRIOR APPLICATION DATA:
(A) APPLICATION NUMBER: 09/975798
(B) FILING DATE: 28-FEB-2001

(viii) ATTORNEY/AGENT INFORMATION:

(A) NAME: Tan, Lee K.
(B) REGISTRATION NUMBER: 39,447
(C) REFERENCE/DOCKET NUMBER: P1014R1C1D1C1

5 (ix) TELECOMMUNICATION INFORMATION:

(A) TELEPHONE: 650/225-4462
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(2) INFORMATION FOR SEQ ID NO:1:

10 (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 108 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY: Linear

15 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:1:

Asp Val Gln Ile Thr Gln Ser Pro Ser Tyr Leu Ala Ala Ser Pro
1 5 10 15

Gly Glu Thr Ile Ser Ile Asn Cys Arg Ala Ser Lys Thr Ile Ser
20 25 30

Lys Tyr Leu Ala Trp Tyr Gln Glu Lys Pro Gly Lys Thr Asn Lys
35 40 45

Leu Leu Ile Tyr Ser Gly Ser Thr Leu Gln Ser Gly Ile Pro Ser
50 55 60

Arg Phe Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile
65 70 75

Ser Ser Leu Glu Pro Glu Asp Phe Ala Met Tyr Tyr Cys Gln Gln
80 85 90

His Asn Glu Tyr Pro Leu Thr Phe Gly Thr Gly Thr Lys Leu Glu
95 100 105

Leu Lys Arg

40 (2) INFORMATION FOR SEQ ID NO:2:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 108 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY: Linear

45 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:2:

Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val
 1 5 10 15

Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Lys Thr Ile Ser
 20 25 30

5 Lys Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys
 35 40 45

10 Leu Leu Ile Tyr Ser Gly Ser Thr Leu Gln Ser Gly Val Pro Ser
 50 55 60

Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile
 65 70 75

15 Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln
 80 85 90

His Asn Glu Tyr Pro Leu Thr Phe Gly Gln Gly Thr Lys Val Glu
 95 100 105

20 Ile Lys Arg

(2) INFORMATION FOR SEQ ID NO:3:

25 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 108 amino acids
 (B) TYPE: Amino Acid
 (D) TOPOLOGY: Linear

30 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:3:

Asp Ile Gln Met Thr Gln Ser Pro Ser Ser Leu Ser Ala Ser Val
 1 5 10 15

Gly Asp Arg Val Thr Ile Thr Cys Arg Ala Ser Gln Ser Ile Ser
 20 25 30

35 Asn Tyr Leu Ala Trp Tyr Gln Gln Lys Pro Gly Lys Ala Pro Lys
 35 40 45

40 Leu Leu Ile Tyr Ala Ala Ser Ser Leu Glu Ser Gly Val Pro Ser
 50 55 60

45 Arg Phe Ser Gly Ser Gly Ser Gly Thr Asp Phe Thr Leu Thr Ile
 65 70 75

Ser Ser Leu Gln Pro Glu Asp Phe Ala Thr Tyr Tyr Cys Gln Gln
80 85 90

Tyr Asn Ser Leu Pro Trp Thr Phe Gly Gln Gly Thr Lys Val Glu
95 100 105

5 Ile Lys Arg

10 (2) INFORMATION FOR SEQ ID NO:4:

15 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 121 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY: Linear

20 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:4:

Glu Val Gln Leu Gln Gln Pro Gly Ala Glu Leu Met Arg Pro Gly
1 5 10 15

25 Ala Ser Val Lys Leu Ser Cys Lys Ala Ser Gly Tyr Ser Phe Thr
20 25 30

30 Gly His Trp Met Asn Trp Val Arg Gln Arg Pro Gly Gln Gly Leu
35 40 45

35 Glu Trp Ile Gly Met Ile His Pro Ser Asp Ser Glu Thr Arg Leu
50 55 60

40 Asn Gln Lys Phe Lys Asp Lys Ala Thr Leu Thr Val Asp Lys Ser
65 70 75

45 Ser Ser Ser Ala Tyr Met Gln Leu Ser Ser Pro Thr Ser Glu Asp
80 85 90

50 Ser Ala Val Tyr Tyr Cys Ala Arg Gly Ile Tyr Phe Tyr Gly Thr
95 100 105

55 Thr Tyr Phe Asp Tyr Trp Gly Gln Gly Thr Thr Leu Thr Val Ser
110 115 120

60 Ser

65 (2) INFORMATION FOR SEQ ID NO:5:

70 (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 121 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY: Linear

5 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:5:

Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly
1 5 10 15
Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Tyr Ser Phe Thr
10 20 25 30
Gly His Trp Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu
15 35 40 45
Glu Trp Val Gly Met Ile His Pro Ser Asp Ser Glu Thr Arg Tyr
50 55 60
Asn Gln Lys Phe Lys Asp Arg Phe Thr Ile Ser Val Asp Lys Ser
65 70 75
20 Lys Asn Thr Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp
80 85 90
Thr Ala Val Tyr Tyr Cys Ala Arg Gly Ile Tyr Phe Tyr Gly Thr
25 95 100 105
Thr Tyr Phe Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser
110 115 120
30 Ser

(2) INFORMATION FOR SEQ ID NO:6:

35 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 113 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY: Linear

40 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:6:

Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly
1 5 10 15
Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Phe Thr Phe Ser
45 20 25 30

Ser Tyr Ala Met Ser Trp Val Arg Gln Ala Pro Gly Lys Gly Leu
 35 40 45

Glu Trp Val Ser Val Ile Ser Gly Asp Gly Gly Ser Thr Tyr Tyr
 50 55 60

5 Ala Asp Ser Val Lys Gly Arg Phe Thr Ile Ser Arg Asp Asn Ser
 65 70 75

Lys Asn Thr Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp
 10 80 85 90

Thr Ala Val Tyr Tyr Cys Ala Arg Gly Phe Asp Tyr Trp Gly Gln
 95 100 105

15 Gly Thr Leu Val Thr Val Ser Ser
 110

(2) INFORMATION FOR SEQ ID NO:7:

20 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 184 amino acids
 (B) TYPE: Amino Acid
 (D) TOPOLOGY: Linear

25 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:7:

Lys Gly Asn Val Asp Leu Val Phe Leu Phe Asp Gly Ser Met Ser
 1 5 10 15

30 Leu Gln Pro Asp Glu Phe Gln Lys Ile Leu Asp Phe Met Lys Asp
 20 25 30

Val Met Lys Lys Leu Ser Asn Thr Ser Tyr Gln Phe Ala Ala Val
 35 40 45

35 Gln Phe Ser Thr Ser Tyr Lys Thr Glu Phe Asp Phe Ser Asp Tyr
 50 55 60

40 Val Lys Arg Lys Asp Pro Asp Ala Leu Leu Lys His Val Lys His
 65 70 75

Met Leu Leu Leu Thr Asn Thr Phe Gly Ala Ile Asn Tyr Val Ala
 80 85 90

45 Thr Glu Val Phe Arg Glu Glu Leu Gly Ala Arg Pro Asp Ala Thr
 95 100 105

Lys Val Leu Ile Ile Ile Thr Asp Gly Glu Ala Thr Asp Ser Gly
110 115 120
Asn Ile Asp Ala Ala Lys Asp Ile Ile Arg Tyr Ile Ile Gly Ile
125 130 135
5 Gly Lys His Phe Gln Thr Lys Glu Ser Gln Glu Thr Leu His Lys
140 145 150
Phe Ala Ser Lys Pro Ala Ser Glu Phe Val Lys Ile Leu Asp Thr
10 155 160 165
Phe Glu Lys Leu Lys Asp Leu Phe Thr Glu Leu Gln Lys Lys Ile
170 175 180
15 Tyr Val Ile Glu

(2) INFORMATION FOR SEQ ID NO:8:

20 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 184 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY: Linear
25 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:8:
Lys Gly Asn Val Asp Leu Ile Phe Leu Phe Asp Gly Ser Met Ser
1 5 10 15
30 Leu Gln Pro Asp Glu Phe Gln Lys Ile Leu Asp Phe Met Lys Asp
20 25 30
Val Met Lys Lys Leu Ser Asn Thr Ser Tyr Gln Phe Ala Ala Val
35 35 40 45
35 Gln Phe Ser Thr Ser Tyr Lys Thr Glu Phe Asp Phe Ser Asp Tyr
50 55 60
40 Val Lys Gln Lys Asp Pro Asp Ala Leu Leu Glu His Val Lys His
65 70 75
Met Leu Leu Leu Thr Asn Thr Phe Gly Ala Ile Asn Tyr Val Ala
80 85 90
45 Thr Glu Val Phe Arg Glu Glu Leu Gly Ala Arg Pro Asp Ala Thr
95 100 105

Lys Val Leu Ile Ile Ile Thr Asp Gly Glu Ala Thr Asp Ser Gly
110 115 120

Asn Ile Asp Ala Ala Lys Asp Ile Ile Arg Tyr Ile Ile Gly Ile
125 130 135

5 Gly Lys His Phe Gln Thr Lys Glu Ser Gln Glu Thr Leu His Lys
140 145 150

Phe Ala Ser Lys Pro Ala Ser Glu Phe Val Lys Ile Leu Asp Thr
10 155 160 165

Phe Glu Lys Leu Lys Asp Leu Phe Thr Glu Leu Gln Lys Lys Ile
170 175 180

15 Tyr Ala Ile Glu

(2) INFORMATION FOR SEQ ID NO:9:

20 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 7 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY: Linear

25 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:9:

Lys His Val Lys His Met Leu
1 5

30 (2) INFORMATION FOR SEQ ID NO:10:

35 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 10 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:10:

Gly Tyr Ser Phe Thr Gly His Trp Met Asn
1 5 10

40 (2) INFORMATION FOR SEQ ID NO:11:

45 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:11:

Met Ile His Pro Ser Asp Ser Glu Thr Arg Tyr Asn Gln Lys Phe
1 5 10 15

5 Lys Asp

(2) INFORMATION FOR SEQ ID NO:12:

10 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 12 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY: Linear

15 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:12:

Gly Ile Tyr Phe Tyr Gly Thr Thr Tyr Phe Asp Tyr
1 5 10

20 (2) INFORMATION FOR SEQ ID NO:13:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 11 amino acids
(B) TYPE: Amino Acid
25 (D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:13:

Arg Ala Ser Lys Thr Ile Ser Lys Tyr Leu Ala
30 1 5 10

(2) INFORMATION FOR SEQ ID NO:14:

35 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 7 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:14:

40 Ser Gly Ser Thr Leu Gln Ser
1 5

(2) INFORMATION FOR SEQ ID NO:15:

45 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 9 amino acids

(B) TYPE: Amino Acid
(D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:15:

5 Gln Gln His Asn Glu Tyr Pro Leu Thr
1 5

(2) INFORMATION FOR SEQ ID NO:16:

10 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 11 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY: Linear

15 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:16:

Pro Lys Asn Ser Ser Met Ile Ser Asn Thr Pro
1 5 10

20 (2) INFORMATION FOR SEQ ID NO:17:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 7 amino acids
(B) TYPE: Amino Acid
25 (D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:17:

30 His Gln Ser Leu Gly Thr Gln
1 5

(2) INFORMATION FOR SEQ ID NO:18:

35 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 8 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:18:

40 His Gln Asn Leu Ser Asp Gly Lys
1 5

(2) INFORMATION FOR SEQ ID NO:19:

45 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 8 amino acids

- (B) TYPE: Amino Acid
- (D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:19:

5 His Gln Asn Ile Ser Asp Gly Lys
1 5

(2) INFORMATION FOR SEQ ID NO:20:

10 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 8 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY: Linear

15 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:20:

Val Ile Ser Ser His Leu Gly Gln
1 5

20 (2) INFORMATION FOR SEQ ID NO:21:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 26 base pairs
(B) TYPE: Nucleic Acid
25 (C) STRANDEDNESS: Single
(D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:21:

30 CACTTGGAT ACCGCGTCCT GCAGGT 26

(2) INFORMATION FOR SEQ ID NO:22:

35 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 26 base pairs
(B) TYPE: Nucleic Acid
(C) STRANDEDNESS: Single
40 (D) TOPOLOGY: Linear

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:22:

45 CATCCTGCAG GTCTGCCTTC AGGTCA 26

(2) INFORMATION FOR SEQ ID NO:23:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY: Linear

5 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:23:

Met Ile Ala Pro Ala Ser Ser Ser Thr Arg Tyr Asn Gln Lys Phe
1 5 10 15

10 Lys Asp

(2) INFORMATION FOR SEQ ID NO:24:

15 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 121 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY: Linear

20 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:24:

Glu Val Gln Leu Val Glu Ser Gly Gly Gly Leu Val Gln Pro Gly
1 5 10 15

25 Gly Ser Leu Arg Leu Ser Cys Ala Ala Ser Gly Tyr Ser Phe Thr
20 25 30

Gly His Trp Met Asn Trp Val Arg Gln Ala Pro Gly Lys Gly Leu
35 40 45

30 Glu Trp Val Gly Met Ile Ala Pro Ala Ser Ser Ser Thr Arg Tyr
50 55 60

35 Asn Gln Lys Phe Lys Asp Arg Phe Thr Ile Ser Val Asp Lys Ser
65 70 75

Lys Asn Thr Leu Tyr Leu Gln Met Asn Ser Leu Arg Ala Glu Asp
80 85 90

40 Thr Ala Val Tyr Tyr Cys Ala Arg Gly Ile Tyr Phe Tyr Gly Thr
95 100 105

Thr Tyr Phe Asp Tyr Trp Gly Gln Gly Thr Leu Val Thr Val Ser
110 115 120

45 Ser

(2) INFORMATION FOR SEQ ID NO:25:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 10 amino acids

(B) TYPE: Amino Acid

(D) TOPOLOGY:

5

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:25:

Gly Tyr Ser Phe Thr Gly His Trp Met Asn
1 5 10

10

(2) INFORMATION FOR SEQ ID NO:26:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 10 amino acids

(B) TYPE: Amino Acid

(D) TOPOLOGY:

15

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:26:

20

Gly Tyr Ala Phe Ala Gly Ala Trp Met Asn
1 5 10

(2) INFORMATION FOR SEQ ID NO:27:

25

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 10 amino acids

(B) TYPE: Amino Acid

(D) TOPOLOGY:

30

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:27:

Gly Tyr Ala Phe Thr Gly His Trp Met Asn
1 5 10

35

(2) INFORMATION FOR SEQ ID NO:28:

40

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 10 amino acids

(B) TYPE: Amino Acid

(D) TOPOLOGY:

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:28:

45

Gly Tyr Ser Phe Ala Gly His Trp Met Asn
1 5 10

(2) INFORMATION FOR SEQ ID NO:29:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 10 amino acids
(B) TYPE: Amino Acid
5 (D) TOPOLOGY:

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:29:

Gly Tyr Ser Phe Thr Ala His Trp Met Asn
10 1 5 10

(2) INFORMATION FOR SEQ ID NO:30:

(i) SEQUENCE CHARACTERISTICS:
15 (A) LENGTH: 10 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY:

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:30:

Gly Tyr Ser Phe Thr Gly Ala Trp Met Asn
20 1 5 10

(2) INFORMATION FOR SEQ ID NO:31:

25 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 10 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY:

30 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:31:

Gly Tyr Ser Phe Thr Gly His Ala Met Asn
35 1 5 10

(2) INFORMATION FOR SEQ ID NO:32:

40 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY:

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:32:

45 Met Ile His Pro Ser Asp Ser Glu Thr Arg Tyr Asn Gln Lys Phe
1 5 10 15

Lys Asp

(2) INFORMATION FOR SEQ ID NO:33:

5 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY:

10 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:33:

Met Ile Ala Pro Ala Asp Ala Glu Thr Arg Tyr Asn Gln Lys Phe
1 5 10 15

15 Lys Asp

(2) INFORMATION FOR SEQ ID NO:34:

20 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY:

25 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:34:

Met Ile His Pro Ser Ala Ser Ala Thr Ala Tyr Asn Gln Lys Phe
1 5 10 15

30 Lys Asp

(2) INFORMATION FOR SEQ ID NO:35:

35 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY:

40 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:35:

Met Ile Ala Pro Ala Asp Ser Glu Thr Arg Tyr Asn Gln Lys Phe
1 5 10 15

45 Lys Asp

5 (2) INFORMATION FOR SEQ ID NO:36:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 17 amino acids

(B) TYPE: Amino Acid

(D) TOPOLOGY:

10 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:36:

Met Ile His Pro Ala Asp Ala Glu Thr Arg Tyr Asn Gln Lys Phe
1 5 10 15

Lys Asp

15 (2) INFORMATION FOR SEQ ID NO:37:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 17 amino acids

(B) TYPE: Amino Acid

(D) TOPOLOGY:

20 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:37:

Met Ile Ala Pro Ser Asp Ala Glu Thr Arg Tyr Asn Gln Lys Phe
25 1 5 10 15

Lys Asp

30 (2) INFORMATION FOR SEQ ID NO:38:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 17 amino acids

(B) TYPE: Amino Acid

(D) TOPOLOGY:

35 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:38:

Met Ile Ala Pro Ser Asp Ser Glu Thr Arg Tyr Asn Gln Lys Phe
40 1 5 10 15

Lys Asp

45 (2) INFORMATION FOR SEQ ID NO:39:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 17 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY:

5 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:39:

Met Ile Ser Pro Ser Asp Ser Glu Thr Arg Tyr Asn Gln Lys Phe
1 5 10 15
Lys Asp

10

(2) INFORMATION FOR SEQ ID NO:40:

15 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY:

20 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:40:

Met Ile His Pro Ala Asp Ser Glu Thr Arg Tyr Asn Gln Lys Phe
1 5 10 15
Lys Asp

25

(2) INFORMATION FOR SEQ ID NO:41:

30 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY:

35 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:41:

Met Ile His Pro Ser Ala Ser Glu Thr Arg Tyr Asn Gln Lys Phe
1 5 10 15

40

Lys Asp

(2) INFORMATION FOR SEQ ID NO:42:

45 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY:

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:42:

Met Ile His Pro Ser Asp Ala Glu Thr Arg Tyr Asn Gln Lys Phe
1 5 10 15

5 Lys Asp

(2) INFORMATION FOR SEQ ID NO:43:

10 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY:

15 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:43:

Met Ile His Pro Ser Asp Asn Glu Thr Arg Tyr Asn Gln Lys Phe
1 5 10 15

20 Lys Asp

(2) INFORMATION FOR SEQ ID NO:44:

25 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY:

30 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:44:

Met Ile His Pro Ser Asp Gln Glu Thr Arg Tyr Asn Gln Lys Phe
1 5 10 15

35 Lys Asp

(2) INFORMATION FOR SEQ ID NO:45:

40 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY:

45 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:45:

Met Ile His Pro Ser Asp Ser Ala Thr Arg Tyr Asn Gln Lys Phe

1

5

10

15

Lys Asp

5 (2) INFORMATION FOR SEQ ID NO:46:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 amino acids
(B) TYPE: Amino Acid
10 (D) TOPOLOGY:

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:46:

Met Ile His Pro Ser Asp Ser Glu Thr Ala Tyr Asn Gln Lys Phe
15 1 5 10 15

Lys Asp

20 (2) INFORMATION FOR SEQ ID NO:47:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 amino acids
(B) TYPE: Amino Acid
25 (D) TOPOLOGY:

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:47:

Met Ile His Pro Ser Asp Ser Glu Thr Arg Tyr Asn Ala Lys Phe
30 1 5 10 15

Lys Asp

35 (2) INFORMATION FOR SEQ ID NO:48:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 amino acids
(B) TYPE: Amino Acid
40 (D) TOPOLOGY:

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:48:

Met Ile His Pro Ser Asp Ser Glu Thr Arg Tyr Asn Gln Ala Phe
45 1 5 10 15

Lys Asp

(2) INFORMATION FOR SEQ ID NO:49:

5 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY:

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:49:

10 Met Ile His Pro Ser Asp Ser Glu Thr Arg Tyr Asn Gln Lys Phe
1 5 10 15
Ala Asp

15 (2) INFORMATION FOR SEQ ID NO:50:

20 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 17 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY:

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:50:

25 Met Ile His Pro Ser Asp Ser Glu Thr Arg Tyr Asn Gln Lys Phe
1 5 10 15
Lys Ala

30 (2) INFORMATION FOR SEQ ID NO:51:

35 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 11 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY:

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:51:

40 Gly Ile Tyr Phe Tyr Gly Thr Thr Tyr Phe Asp
1 5 10

(2) INFORMATION FOR SEQ ID NO:52:

45 (i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 11 amino acids
(B) TYPE: Amino Acid

(D) TOPOLOGY:

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:52:

Gly Ile Ala Phe Ala Gly Thr Thr Tyr Phe Asp
5 1 5 10

(2) INFORMATION FOR SEQ ID NO:53:

(i) SEQUENCE CHARACTERISTICS:

10 (A) LENGTH: 11 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY:

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:53:

Gly Ile Tyr Phe Tyr Gly Ala Ala Ala Phe Asp
15 1 5 10

(2) INFORMATION FOR SEQ ID NO:54:

20 (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 11 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY:

25 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:54:

Gly Ile Ala Phe Tyr Gly Thr Thr Tyr Phe Asp
30 1 5 10

(2) INFORMATION FOR SEQ ID NO:55:

(i) SEQUENCE CHARACTERISTICS:

35 (A) LENGTH: 11 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY:

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:55:

40 Gly Ile Tyr Phe Ala Gly Thr Thr Tyr Phe Asp
1 5 10

(2) INFORMATION FOR SEQ ID NO:56:

45 (i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 11 amino acids
(B) TYPE: Amino Acid

(D) TOPOLOGY:

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:56:

Gly Ile Tyr Phe Tyr Gly Ala Thr Tyr Phe Asp
5 1 5 10

(2) INFORMATION FOR SEQ ID NO:57:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 11 amino acids
- (B) TYPE: Amino Acid
- (D) TOPOLOGY:

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:57:

Gly Ile Tyr Phe Tyr Gly Thr Ala Tyr Phe Asp
15 1 5 10

(2) INFORMATION FOR SEQ ID NO:58:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 11 amino acids
- (B) TYPE: Amino Acid
- (D) TOPOLOGY:

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:58:

Gly Ile Tyr Phe Tyr Gly Thr Thr Ala Phe Asp
20 1 5 10

(2) INFORMATION FOR SEQ ID NO:59:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 11 amino acids
- (B) TYPE: Amino Acid
- (D) TOPOLOGY:

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:59:

Arg Ala Ser Lys Thr Ile Ser Lys Tyr Leu Ala
25 1 5 10

(2) INFORMATION FOR SEQ ID NO:60:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 11 amino acids
- (B) TYPE: Amino Acid

(D) TOPOLOGY:

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:60:

Arg Ala Ser Ala Ala Ile Ala Ala Tyr Leu Ala
5 1 5 10

(2) INFORMATION FOR SEQ ID NO:61:

(i) SEQUENCE CHARACTERISTICS:

- (A) LENGTH: 7 amino acids
- (B) TYPE: Amino Acid
- (D) TOPOLOGY:

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:61:

Ser Gly Ser Thr Leu Gln Ser
1 5

(2) INFORMATION FOR SEQ ID NO:62:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 7 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY:

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:62:

Ala Gly Ala Ala Leu Gln Ser
1 5

(2) INFORMATION FOR SEQ ID NO:63:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 7 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY:

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:63:

Ala Gly Ser Thr Leu Gln Ser
1 5

(2) INFORMATION FOR SEQ ID NO:64:

(i) SEQUENCE CHARACTERISTICS:
(A) LENGTH: 7 amino acids
(B) TYPE: Amino Acid

(D) TOPOLOGY:

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:64:

5 Ser Gly Ala Thr Leu Gln Ser
 1 5

(2) INFORMATION FOR SEQ ID NO:65:

10 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 7 amino acids
 (B) TYPE: Amino Acid
 (D) TOPOLOGY:

15 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:65:

15 Ser Gly Ser Ala Leu Gln Ser
 1 5

20 (2) INFORMATION FOR SEQ ID NO:66:

20 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 9 amino acids
 (B) TYPE: Amino Acid
 (D) TOPOLOGY:

25 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:66:

30 Gln Gln His Asn Glu Tyr Pro Leu Thr
 1 5

30 (2) INFORMATION FOR SEQ ID NO:67:

35 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 9 amino acids
 (B) TYPE: Amino Acid
 (D) TOPOLOGY:

35 (xi) SEQUENCE DESCRIPTION: SEQ ID NO:67:

40 Gln Gln His Ala Ala Ala Pro Leu Thr
 1 5

40 (2) INFORMATION FOR SEQ ID NO:68:

45 (i) SEQUENCE CHARACTERISTICS:
 (A) LENGTH: 9 amino acids
 (B) TYPE: Amino Acid

(D) TOPOLOGY:

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:68:

Gln Gln Ala Asn Glu Tyr Pro Leu Thr
5 1 5

(2) INFORMATION FOR SEQ ID NO:69:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 9 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY:

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:69:

Gln Gln His Ala Glu Tyr Pro Leu Thr
1 5

(2) INFORMATION FOR SEQ ID NO:70:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 9 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY:

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:70:

Gln Gln His Asn Ala Tyr Pro Leu Thr
1 5

(2) INFORMATION FOR SEQ ID NO:71:

(i) SEQUENCE CHARACTERISTICS:

(A) LENGTH: 9 amino acids
(B) TYPE: Amino Acid
(D) TOPOLOGY:

(xi) SEQUENCE DESCRIPTION: SEQ ID NO:71:

Gln Gln His Asn Glu Ala Pro Leu Thr
1 5

45